SNOW SURVEYS AND IRRIGATION WATER FORECASTS

FOR OREGON

AS OF

APRIL 1, 1940

* * *

Issued April 11, 1940

by

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and
Oregon Agricultural Experiment Station, Medford Branch
Cooperating

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Data included in this report were obtained by the agencies listed above, in cooperation with the Oregon State Engineer, U. S. Forest Service, National Park Service and other Federal, State and local organizations. 1/

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1/ The snow measurements are made principally by field personnel of the following organizations:

STATE
- Idaho Cooperative Snow Surveys
- Nevada Cooperative Snow Surveys
- Oregon Agricultural Experiment Station
- Oregon State Engineer and corps of State Watermasters
- Oregon State Highway Engineers

FEDERAL
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
  - Weather Bureau
- Department of Interior
  - Biological Survey
  - Bureau of Reclamation
  - Geological Survey
  - Indian Service
  - National Park Service

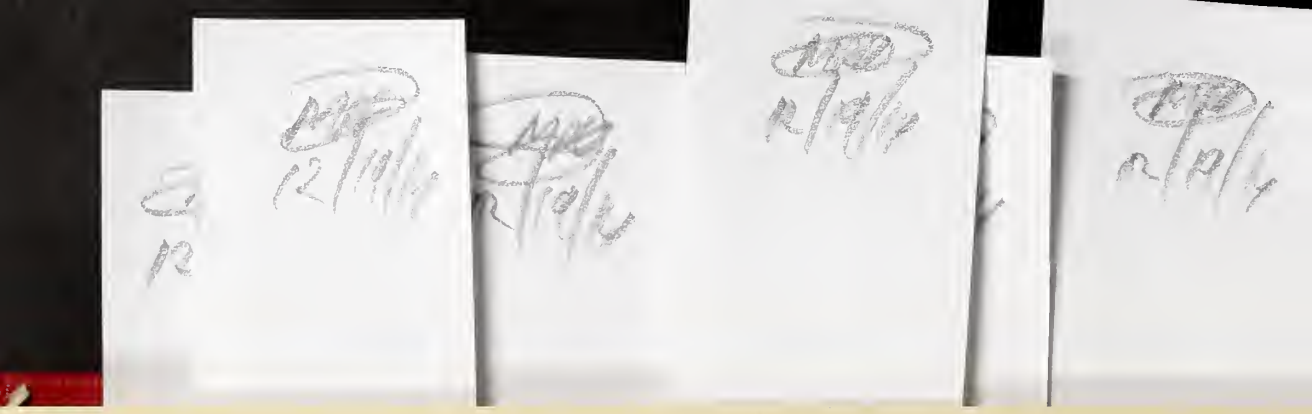
PUBLIC UTILITIES
- Eastern Oregon Light and Power Company
- Portland General Electric Company
- The California Oregon Power Company

MUNICIPALITIES
- City of Corvallis
- City of La Grande
- City of The Dalles

MUNICIPAL DISTRICTS
- Central Oregon Irrigation District
- Deschutes County Municipal Improvement District
- Grants Pass Irrigation District
- Lakeview Water Users' Association
- Medford and Rogue River Irrigation Districts
- Ochoco Irrigation District
- Warmsprings Irrigation District

2/ Water content determined by melting a measured sample. (The California Oregon Power Company's station.)

3/ N. R. = No report.



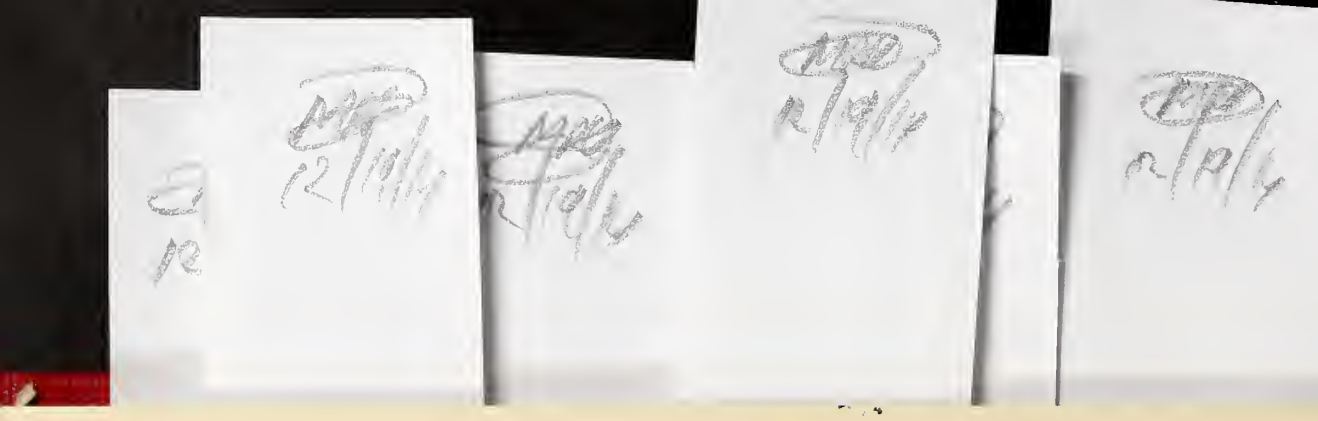
STATUS OF VALLEY PRECIPITATION AS OF OCTOBER 1 TO DATE

Month	Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Period	
Section	P	D	P	D	P	D	P	D	P	D	P	D	P	D
S. E.	.69	-0.03	.11	-0.78	1.30	+0.26	1.86	+0.72	2.15	+1.36	1.9	+1.1	8.01	+2.63
S. C.	1.14	+0.14	.05	-1.65	4.23	+2.48	2.29	+0.37	3.96	+2.22	3.6	+2.3	15.27	+5.86
N. C.	.43	-0.37	.07	-1.48	2.25	+0.75	2.02	+0.23	2.16	+0.91	2.1	+1.1	9.03	+1.14
Col. Riv.	.38	-0.58	.04	-1.76	1.90	+0.30	1.97	+0.32	3.38	+2.04	1.5	+0.4	9.17	+0.72
Wal. Mts.	2.09	+0.84	.09	-1.88	2.13	+0.18	1.95	+0.27	2.15	+1.08	1.9	+0.2	10.31	+0.69
Blue Mts.	1.11	-0.38	.12	-1.93	2.16	+0.27	1.86	+0.30	3.58	+1.62	3.0	+1.2	11.83	+1.08
Southern	2.28	+0.43	.15	-3.74	7.17	+3.44	2.72	-1.36	6.48	+3.44	5.3	+2.5	24.10	+4.71
Willamette	3.98	+0.10	1.44	-6.55	10.26	+2.30	4.35	-3.23	12.79	+6.24	6.8	+1.2	39.62	+0.06
Area	1.51	+0.02	0.26	-2.47	3.92	+1.25	2.38	-0.30	4.58	+2.36	3.3	+1.2	15.92	+2.11

P - Inches precipitation. D - Inches departure from normal.

S. E. - Southeastern Oregon range lands, Harney and Malheur Counties.
S. C. - Southcentral Oregon range lands, Lake County and Klamath County, except the Cascade Mountains.
N. C. - Northcentral Oregon wheat and range lands, Crook, Deschutes, Jefferson, Wheeler and part of Grant Counties.
Col. Riv. - Columbia River area, wheat and range lands, Gilliam, Morrow, Sherman, Wasco and part of Umatilla Counties.
Wal. Mts. - Wallowa Mountain area, forest and range lands, Wallowa and part of Baker County.
Blue Mts. - The Blue Mountain forest and range area, Union and parts of Baker, Grant and Umatilla Counties.
Southern - Southern Oregon irrigated section, Jackson and Josephine Counties.
Willamette - Parts of Polk, Benton, Yamhill, Washington, Lane and all of Linn, Marion, Clackamas and Multnomah Counties.

Note: Data for the last month shown above are preliminary only, as they are based on a few stations only. Data for earlier months have been corrected to include all the stations in climatological data for the area.

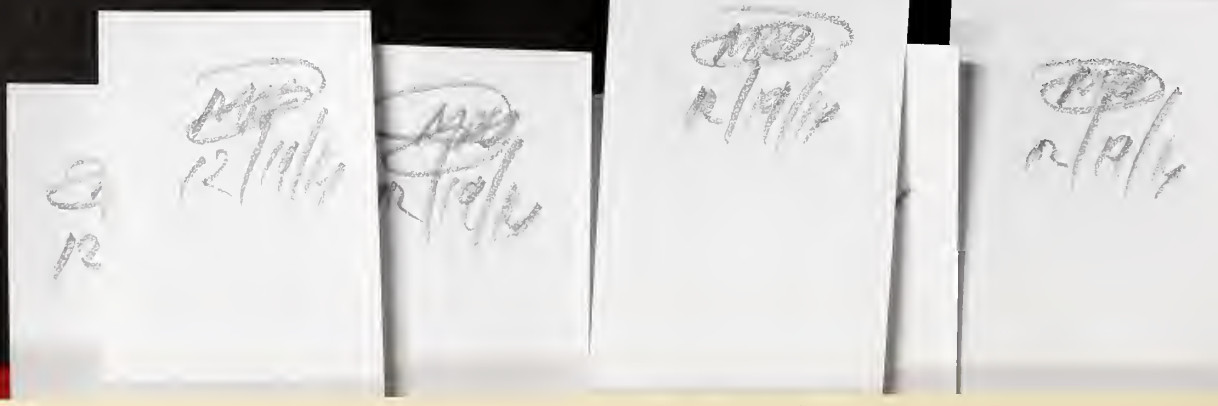


STATUS OF RESERVOIR STORAGE AS OF APRIL FIRST

In the following tabulation, water storage in acre feet in some selected Oregon reservoirs as of about April 1, 1940 is compared with storage as of March 1, 1940, as well as with storage as of approximately April 1 of 1939, 1938 and 1937.

Storage Reservoir	Stream Basin	Capacity Acre Feet	Acre Feet in Storage				
			About 4-1-40	About 3-1-40	About 4-1-39	About 4-1-38	About 4-1-37
Agency Valley	Malheur	60,000	60,300	49,180[g]	54,280	49,690	30,000
Antelope	Owyhee	33,434	18,093	Empty	6,467[g]	22,620	6,070
Clear Lake	Lost River	440,240[b]	277,920[b]	241,480[b]	249,600[b]	218,110[b]	77,350[b]
Crane Prairie	Deschutes	55,220[c]	36,230	37,000[a]	33,000	Full	40,240
Crescent Lake	Deschutes	80,000	32,560	31,480	56,760	35,190	27,430
Drew Creek	Goose Lake	62,500	58,070	41,500	46,640	48,830	39,400
Emigrant Gap	Rogue	8,200	Full	Full	Full	8,155	6,400
Fish Lake	Rogue	7,720	5,025	4,430	6,202	4,683	4,992
Four Mile Lake	Klamath[d]	14,000	8,100	7,826	10,628	11,767	8,746
Gerber	Klamath	94,000[b]	80,120[b]	59,220[b]	54,390[b]	36,920[b,f]	44,390[b]
Hyatt Prairie	Klamath[d]	16,000	7,340	4,400	11,104	8,607	4,700
McKay	Umatilla	75,000	54,160	32,840	60,400	49,840	25,900
Ochoco	Crooked	47,500	17,490	4,060	30,630	27,950	3,440
Owyhee	Owyhee	715,000	611,150	464,170	688,850	639,260	682,860
Thief Valley	Powder	17,400	Full	11,912	13,420	17,400	17,400
Upper Klamath Lake	Klamath	524,800[b]	488,400[b]	383,500[b]	462,500[b]	459,800[b]	325,900[b]
Wallowa Lake	Wallowa	40,920	13,820	11,710	38,200	16,490	7,810
Warm Springs	Malheur	190,000	134,800	85,500	163,520	89,250	46,500
Willow Creek	Malheur	26,000	600[e]	600[e]	8,250	1,500	Dry

a - Estimated.
b - Available for use.
c - 40,500 by agreement.
d - By ditch to Rogue River side.
e - Approximate
f - 28,000 A.F. released during February and March to prepare for spring inflow.
g - Interpolated.



STATUS OF WATERSHED SOIL MOISTURE

(Refer to pages 5 and 6 of February 1, 1940 Snow Survey report for Oregon for additional discussion of this subject.)

Oregon watershed soils are unfrozen and in all locations are reported as wet to very wet.

Summary of Watershed Outpost
Soil Moisture Determinations
Southern Oregon 1936 - 1940
(Soil moisture each sampling date expressed as percentage of that found in the fall of 1937)

Outpost	Date	0-3	3-6	0-6	Outpost	Date	0-3	3-6	0-6
Annie	11-14-36	27.4	39.2	32.0	Fish	11-14-36	48.0	56.8	52.8
Spring	10-21-37	100.0	100.0	100.0	Lake	5-11-37	88.5	89.9	89.3
snow	10-18-38	59.4	55.5	58.1	snow	10-22-37	100.0	100.0	100.0
course	11-8-39	60.3	59.3	59.9	course	10-14-38	45.1	61.5	53.7
Elev.	3-20-40	73.7	87.6	79.0	Elev.	11-7-39	86.5	83.4	85.0
6018					4865	* 3-21-40	86.2	93.0	90.0
Whale-	11-20-36	65.1	75.8	69.9	Sis-	11-15-36	46.0	-	-
back	10-21-37	100.0	100.0	100.0	kiyou	5-15-37	107.8	-	-
snow	10-15-38	63.2	71.9	67.0	Summit	10-20-37	100.0	-	-
course	11-8-39	79.1	85.6	82.0	snow	10-17-38	51.3	-	-
Elev.	No measurement spring of 1940				course	11-7-39	51.3	-	-
5140					Elev.	3-18-40	88.6	-	-
					4630				
Hyatt	11-3-36	53.0	73.8	65.6	Avg.	11-3 to			
Prairie	5-15-37	94.7	77.9	82.3	all	11-20-36	47.9	61.4	55.1
snow	10-20-37	100.0	100.0	100.0	out-	5-11 to			
course	10-17-38	45.2	40.1	41.1	posts,	5-15-37	97.0	83.9	85.8
Elev.	11-7-39	75.1	66.8	69.9	27 sam-	10-20 to			
4900	* 3-18-40	90.1	71.2	78.6	pling	10-22-37	100.0	100.0	100.0
					loca-	10-14 to			
					tions	10-18-38	52.8	57.2	55.0
						11-7 to			
						11-8-39	70.4	73.8	74.2
					**	3-18 to			
						3-21-40	84.6	83.9	82.5

* Little or no snow left on ground surface.
** Average of all locations, except those on Whaleback snow course.

These data indicate that the soil mantle in the Siskiyou and Cascade Mountains of southern Oregon contains less water than in either the spring or fall of 1937, in spite of the fact that precipitation has been above normal.

Watershed soil moisture outposts were established in 1939 on Ochoco Mountain near Marks Creek snow course No. 344 and on Blue Mountain Summit snow course No. 141. The only comparison of soil moisture available for those stations is between the fall of 1939 and spring of 1940. In the following table, soil moisture of each foot depth (the average of several locations in each case) at each outpost is shown for each sampling date. Soil moisture is expressed as a percentage of soil dry weight.

Soil Moisture Outpost	Date \ Depth	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8
Ochoco Mountain	11-21-39	17.0	30.0	39.7	41.7	43.1	43.7	-	-
	3-26-40	58.3	53.6	59.7	42.4	41.0	41.8	40.0	26.4
Blue Mtn. Summit	11-20-39	19.8	20.0	19.7	20.9	21.8	Bedrock		
	3-26-40	54.8	32.4	25.2	28.6	23.4	Bedrock		

These data indicate that fall rains and melting snow (the ground was bare on both outposts when the March 26, 1940 samples were taken) have wet the soil at Ochoco Mountain outpost to a depth of three feet and at Blue Mountain Summit outpost to a depth between four and five feet.

A watershed soil moisture outpost was established at Chemult snow course No. 834 on March 27, 1940 when samples to a depth of eight feet were taken at six locations. Because there are no preceding values with which this spring's soil moisture at this outpost may be compared, those results are not included here.


WASHINGTON
PACIFIC OCEAN
CALIFORNIA
NEVADA
IDAHO
COLUMBIA RIVER
CLATSOP
COLUMBIA
TILLAMOOK
WASHINGTON
YAMHILL
CLACKAMAS
MULTNOMAH
PORTLAND
HOOD
SANDY
HOOD RIVER
SHERMAN
GILLIAM
WASCO
MARION
POLK
LINCOLN
BENTON
LANE
JEFFERSON
WHEELER
CROOK
DESCHUTES
LOWER DESCHUTES
UPPER DESCHUTES
JOHN DAY
GRANT
WALLA WALLA
UMATILLA
MORROW
GRANDE RONDE
WALLOWA
BAKER
POWDER
BURNT
WILLOW
MALHEUR
OWYHEE
DOUGLAS
COOS
UMPQUA
CURRY
JOSEPHINE
JACKSON
ROGUE
KLAMATH
LAKE
HARNEY
Pendleton
Silver Lake
MALHEUR LAKE
HARNEY LAKE
Davis Lake
Odell Lake
Crescent Lake
CRATER LAKE
SUMMER LAKE
LAKE ABERT
WARNER LAKES
Alvord Lake
UPPER KLAMATH LAKE
Klamath Falls
Lower Klamath Lake
GOOSE LAKE
CROWDER FLAT
BALD MT.
Scale in Miles
REGION 9
OREGON WATERSHEDS
SNOW SURVEYS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
H. H. BENNETT, Chief
REFERENCE: Base U.S. Geological Survey
DRAFTING APPROVAL
TECHNICAL APPROVAL
COMPILED
TRACED J.t.c
CHECKED
DATE 2-6-40
DRAWING NUMBER

INDEX TO SNOW COURSES

Number	Name	Elev.
	UPPER COLUMBIA DRAINAGE Lower Snake in Oregon	
	OWYHEE RIVER	
Nev. 1	Big Bend	6800
Nev. 2	Buckskin, Lower	6800
Nev. 3	Buckskin, Upper	8200
952	Fish Creek	7900
Nev. 5	Fry Canyon	6800
Nev. 6	Gold Creek Ranger Sta.	6600
Nev. 7	Granite Peak	8600
Nev. 8	Jack Creek, Lower	7000
Nev. 9	Jack Creek, Upper	7800
Nev. 10	Martin Creek	7000
Nev. 11	Rodeo Flat	7000
Ida. 12	Silver City	6400
951	Silvies	6900
Ida. 13	South Mountain	5100
Nev. 15	Taylor Canyon	5200
	MALHEUR RIVER	
133	Blue Mountain Spring	5900
137	Crane Prairie	5375
136	Lake Creek	5120
134	Rock Spring	5100
135	Stinking Water	4800
	BURNT RIVER	
141	Blue Mountain Summit	5098
156	Dooley Mountain	5430
142	Tipton	5100
	POWDER RIVER	
155	Anthony Lake	7125
154	Bourne	5800
156	Dooley Mountain	5430
1518	Eilertson Meadows	5400
249	Gold Center	5340
184	Summit Springs	6000
185	Taylor Green	5740
	PINE CREEK	
161	Schneider Meadows	5400
	GRANDE RONDE RIVER	
183	Aneroid Lake	7480
155	Anthony Lake	7125
188	Beaver Reservoir	5340
187	Camp Carson	5970
186	Moss Spring	5860
248	Schoolmarm	4775
184	Summit Springs	6000
185	Taylor Green	5740
212	Tollgate	5070

Number	Name	Elev.
	LOWER COLUMBIA DRAINAGE	
	WALLA WALLA RIVER	
212	Tollgate	5070
	UMATILLA RIVER	
222	Emigrant Springs	3925
223	Lucky Strike	5050
221	Meacham	4300
212	Tollgate	5070
	WILLOW CREEK	
241	Arbuckle Mountain	5400
	JOHN DAY RIVER	
241	Arbuckle Mountain	5400
246A	Beech Creek Summit	4800
133	Blue Mountain Spring	5900
141	Blue Mountain Summit	5098
244	Dixie Springs	6650
245	Olive Lake	6000
249	Gold Center	5340
964	Izee Summit	5293
248	Schoolmarm	4775
247	Starr Ridge	5156
	DESCHUTES RIVER	
326	Caldwell Ranch	4400
321	Cascade Summit	4880
327	Charlton Lake	5750
361	Clear Lake	3500
325	Crescent Lake	4760
343	Darr	5670
351	Hogg Pass	4755
344	Marks Creek	4540
324A	New Dutchman Flat	6400
341	Ochoco Meadows	5200
342	Tamarack	4800
331	Three Creeks Meadows	5600
	HOOD RIVER	
431	Brooks Meadows	4300
	SANDY RIVER	
361	Clear Lake	3500
452	Phlox Point - Mt. Hood	5600
451	Still Creek	3700
	CLACKAMAS RIVER	
592	Clackamas Lake	3400
591	Peavine Ridge	3500
	WILLAMETTE RIVER	
321	Cascade Summit	4880
522	Champion	4500
327	Charlton Lake	5750
351	Hogg Pass	4755
531	McKenzie	4800
541	Mary's Peak	3620
521A	Waldo Lake	5500

Number	Name	Elev.
	INTERIOR DRAINAGE	
	SILVER LAKE	
942	Silver Creek	4900
	CHEWAUCAN RIVER	
922	Mill Creek	6200
	HARNEY BASIN	
973	Deer Creek	6670
952	Fish Creek	7900
971	Hart Mountain	6350
961A	Idylwild Park	5200
964	Izee Summit	5293
134	Rock Spring	5100
951	Silvies	6900
247	Starr Ridge	5156
	WARNER LAKE	
911A	Camas Creek	5720
	GUANO LAKE	
Nev.	Bald Mountain	6720
972	Guano Creek	6480
	WEST COAST DRAINAGE	
	UMPQUA RIVER	
522	Champion	4500
743	Diamond Lake	5315
726	Goolaway Gap	3000
7215	Goolaway Mountain	3730
742	N. Umpqua near Lake Creek	4215
741	Trap Creek	3800
7217	Whaleback	5140
	ROGUE RIVER	
7216	Althouse	4400
831	Annie Spring	6018
729	Big Red Mountain	6500
722	Billie Creek Divide	6000
725	Fish Lake	4865
726	Goolaway Gap	3000
7215	Goolaway Mountain	3730
727	Grayback Peak	6000
723	Hyatt Prairie Reservoir	4900
7210	Little Red Mountain	6500
7211	Seven Lakes No. 1	6800
7212	Seven Lakes No. 2	6200
7219	Silver Burn	3720
728	Siskiyou Summit	4630
7218	South Fork Canal	3500
7213	Wagner Butte	6900
7217	Whaleback	5140

Number	Name	Elev.
	KLAMATH LAKE BASIN	
831	Annie Spring	6018
722	Billie Creek Divide	6000
834	Chemult No. 1	4760
Calif.	Crowder Flat	5200
723	Hyatt Prairie Reservoir	4900
835	Lake of the Woods	4960
811	Quartz Mountain	5320
7211	Seven Lakes No. 1	6800
7212	Seven Lakes No. 2	6200
837	Strawberry	5600
841	Summer Rim	7200
836	Sun Mountain	5350
842	Taylor Butte	5100
	GOOSE LAKE BASIN	
911A	Camas Creek	5720
811	Quartz Mountain	5320
837	Strawberry	5600
	INDEX TO CALIFORNIA-OREGON POWER COMPANY SNOW WATER STATIONS	
	KLAMATH LAKE BASIN	
1	Beatty	4300
2	Chemult	4761
3	Chiloquin	4187
4	Crystal	4200
5	Fort Klamath	4150
6	Kirk	4533
7	Lake of the Woods	4960
8	Pelican	4200
9	Quartz Mountain	5504
10	Richardson Ranch	4800
11	Rocky Point	4150
12	Yamsey	4600
	GOOSE LAKE BASIN	
9	Quartz Mountain	5504

COMPARISON OF SNOW COVER AS OF APRIL FIRST WITH THAT OF PREVIOUS YEARS

Stormy periods early and late in the month generally increased the snow cover at very high elevations over the amounts reported for Oregon as of March 1, 1940. At elevations between 5,000 and 6,000 feet snow cover decreased somewhat and on nearly all courses below 5,000 feet a very marked reduction in snow cover occurred during the month. For elevations above 5,000 feet, of the 63 snow courses reporting April 1, 1940, 49 were measured last month, 60 were measured about April 1, 1939, 51 were measured about April 1, 1938 and 44 were measured about April 1, 1937. Comparison of records on these courses for the approximate dates mentioned follows:

Snow cover (water content) now present above 5,000 feet:

As percent of that present one month ago --------	59
As percent of that present one year ago --------	81
As percent of that present two years ago --------	40
As percent of that present three years ago -------	54

For elevations from 3,000 to 5,000 feet, of the 39 courses and Copco water stations reporting about April 1, 1940, 29 were measured last month, 39 were measured about April 1, 1939, 35 were measured about April 1, 1938 and 31 were measured about April 1, 1937. Comparison of records on these courses for the approximate dates mentioned follows:

Snow cover (water content) now present from 3,000 to 5,000 feet:

As percent of that present one month ago --------	43
As percent of that present one year ago --------	36
As percent of that present two years ago --------	9
As percent of that present three years ago -------	18

Snow water content on 70 percent of all courses at all elevations is less than at this time last year and, with 12 exceptions out of 158 comparisons, is substantially less than on about April 1 of either 1938 or 1937.

Snow cover generally is less than on April 1 of 1931. That was a year in which summer stream flow was generally very deficient. Snow cover also is generally less than in 1934, another year of deficient summer stream flow.

Narrative water supply forecasts for various Oregon stream basins are contained in this report beginning on Page 17.

STATUS OF SNOW COVER AS OF APRIL FIRST (Con't.)

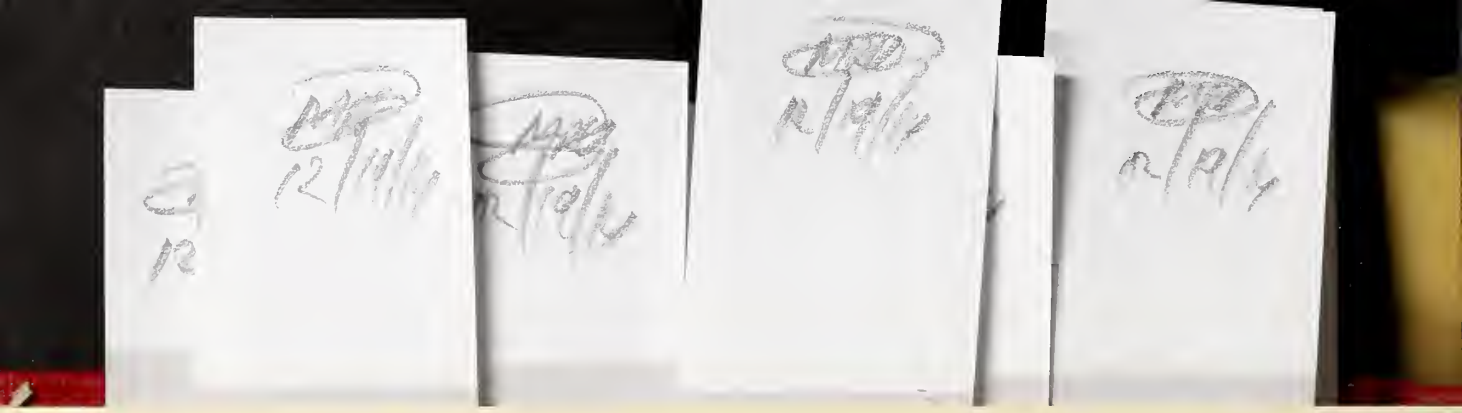
Summary of Snow Survey Data
by Tributary Drainages as of about April First

Tributary Drainage	Number of snow courses averaged	Average Water Depth in Snow Cover (Inches) 1940	1939	1938	1937	1940 Snow Water Depth (In.) expressed as % of that in 1939	1938	1937
Owyhee River	4	3.9	3.4			115		
	4	3.9		14.3			27	
	4	3.9			5.4			72
Malheur River	5	1.8	4.7			38		
	5	1.8		11.9			15	
	2	4.4			10.0			44
Burnt River	3	3.8	3.3			115		
	2	3.1		9.4			33	
	1	1.0			6.1			16
Powder River	7	12.3	14.2			87		
	5	14.7		19.3			76	
	3	17.0			21.4			79
Pine Creek	1	17.4	23.5			74		
	1	17.4		40.6			43	
	-	-			-			-
Grande Ronde River	9	14.9	19.7			76		
	7	17.4		24.8			70	
	4	22.3			26.8			83
Walla Walla River	1	18.7	29.8			63		
	1	18.7		23.0			81	
	1	18.7			25.9			72
Umatilla River	4	6.7	15.4			43		
	3	6.7		11.7			57	
	3	6.7			15.5			43
Willow Creek	1	4.1	11.8			35		
	1	4.1		13.0			32	
	1	4.1			18.7			22
John Day River	10	5.5	9.3			59		
	8	6.0		14.3			42	
	8	6.0			12.6			48
Deschutes River	8	11.3	27.8			41		
	8	11.3		30.5			37	
	7	10.0			25.8			39

Crooked River	4	2.2	4.9			45		
	4	2.2		10.6			21	
	4	2.2			11.2			27
Hood River	1	Trace	9.0			1		
	1	"		19.0			1	
	1	"			15.5			1
Sandy River	3	11.5	34.5			33		
	3	11.5		35.2			33	
	3	11.5			36.5			31
Clackamas River	1	2.9	23.3			12		
	1	2.9		23.7			12	
	1	2.9			25.2			11
Willamette River	7	11.4	35.4			32		
	4	15.2		35.7			43	
	3	13.5			30.7			44
Silver Lake	1	0.0	0.0			0		
Chewaucan River	1	3.5	2.2			159		
Harney Basin	7	4.5	6.3			71		
	5	1.7		9.4			18	
	5	1.7			5.5			31
Warner Lake	1	3.4	6.7			51		
	-	-		-			-	
	1	3.4			13.2			26
Umpqua River	7	4.5	20.1			22		
	6	4.9		25.9			19	
	6	4.9			19.4			25
Upper Rogue River	13	12.3	21.1			58		
	13	12.3		30.2			41	
	13	12.3			24.7			50
Applegate River	4	19.2	21.0			91		
	4	19.2		39.1			49	
	4	19.2			29.2			66
Illinois River	2	7.5	18.0			42		
	2	7.5		40.1			19	
	2	7.5			28.0			27
Klamath Lake Basin	*22	6.9	10.6			65		
	*21	7.9		18.6			42	
	*21	7.9			14.7			54
Goose Lake Basin	* 4	0.9	2.7			33		
	* 2	0.0		9.2			0	
	* 3	0.9			10.5			9

*Including Copco water measurement stations.

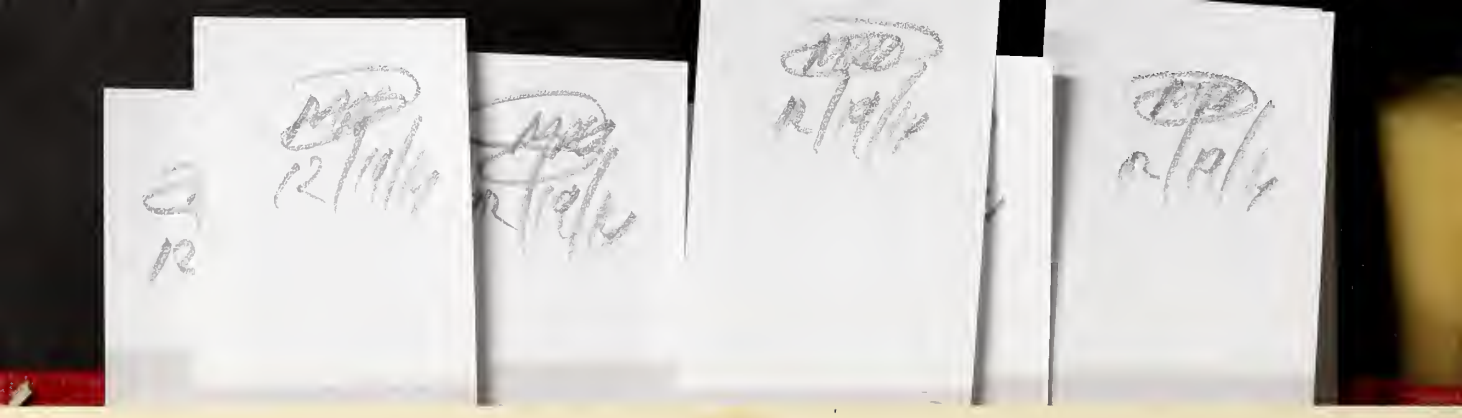
TRIBUTARY BASINS (Primary & Secondary & Snow Courses)	Oregon Number	LOCATION Sec.	Twp.	Range	Elev.	SNOW COVER MEASUREMENTS About April 1, 1940 Date	Avg. Snow Depth (In.)	Avg. Water Depth (In.)	AVERAGE WATER DEPTH (INCHES) One Month ago (3-1-40)	One Year ago (4-1-39)	Two Years ago (4-1-38)	Three Years ago (4-1-37)
UPPER COLUMBIA DRAINAGE												
LOWER SNAKE IN OREGON												
OWYHEE RIVER												
Upper Buckskin	Nev.	14	45N	39E	8200	3-31	22.6	8.8	10.8	3.7	17.5	8.3
Big Bend	Nev.	30	45N	56E	6800	4-3	12.3	3.8	6.4	3.4	11.4	10.5
Silver City	Idaho	6	5S	3W	6400	4-1	8.3	3.2	9.4	6.5	26.6	2.7
South Mountain	Idaho	19	9S	5W	5100	4-1	0.0	0.0	0.8	0.0	1.8	0.0
MALHEUR RIVER												
Blue Mountain Spring	133	21	15S	35E	5900	3-30	25.5	8.8	10.3	11.1	23.4	16.1
Crane Prairie	137	24	16S	34E	5375	3-31	0.0	0.0	6.9	3.8	11.5	-
Lake Creek	136	10	16S	33½E	5120	3-31	0.0	0.0	9.0	7.7	14.3	-
Rock Spring	134	23	18S	32E	5100	4-1	0.0	0.0	5.4	0.9	8.8	3.9
Stinking Water	135	6	21S	37E	4800	4-1	0.0	0.0	6.3	0.0	1.2	-
BURNT RIVER												
Dooley Mountain	156	32	11S	40E	5430	4-2	15.3	5.3	8.2	3.0	-	-
Tipton	142	34	10S	35½E	5100	3-30	12.1	5.2	-	3.5	9.9	-
Blue Mountain Summit	141	6	12S	36E	5098	3-26	3.0	1.0	5.4	3.0	8.9	6.2
POWDER RIVER												
Anthony Lake	155	18	7S	37E	7125	4-1	57.2	21.8	19.0	30.0	25.0	27.9
Summit Springs	184	9	6S	37E	6000	4-2	44.1	17.3	-	20.2	22.9	25.7
Bourne	154	33	8S	37E	5800	3-31	29.3	11.9	13.0	11.1	17.1	10.5



TRIBUTARY BASINS (Primary & Secondary & Snow Courses)	Oregon Number	LOCATION Sec.	Twp.	Range	Elev.	SNOW COVER MEASUREMENTS About April 1, 1940 Date	Avg. Snow Depth (In.)	Avg. Water Depth (In.)	AVERAGE WATER DEPTH (INCHES) One Month ago (3-1-40)	One Year ago (4-1-39)	Two Years ago (4-1-38)	Three Years ago (4-1-37)
Taylor Green	185	3	6S	42E	5740	3-29	35.3	12.0	-	15.7	15.8	-
Dooley Mountain	156	32	11S	40E	5430	4-2	15.3	5.3	8.2	3.0	-	-
Eilertson Meadows	151B	18	8S	38E	5400	3-31	20.2	10.7	13.2	9.8	15.7	-
Gold Center	249	21	9S	36E	5340	4-1	18.4	6.8	10.4	9.6	-	-
PINE CREEK												
Schneider Meadows	161	35	6S	45E	5400	3-31	56.4	17.4	-	23.4	40.6	-
GRANDE RONDE RIVER												
Aneroid Lake	183	16	4S	45E	7480	3-28	86.9	31.5	-	30.1	47.3	27.9
Anthony Lake	155	18	7S	37E	7125	4-1	57.2	21.8	19.0	30.0	25.0	27.9
Summit Springs	184	9	6S	37E	6000	4-2	44.1	17.3	-	20.2	22.9	25.7
Camp Carson	187	33	6S	36E	5970	4-1	0.0	0.0	-	10.6	10.2	-
Moss Spring	186	27	3S	41E	5860	3-28	53.4	20.9	18.0	28.0	29.3	-
Taylor Green	185	3	6S	42E	5740	3-29	35.3	12.0	-	15.7	15.8	-
Beaver Reservoir	188	8	5S	37E	5340	4-6	15.6	11.7	17.3	8.6	-	-
Schoolmarm	248	28	4S	34E	4775	3-31	0.0	0.0	2.1	4.4	-	-
Meacham	221	24&25	1S	35E	4300	3-26	3.2	1.3	7.5	10.4	8.2	12.8
LOWER COLUMBIA DRAINAGE												
WALLA WALLA RIVER												
Tollgate	212	32	4N	38E	5070	3-27	41.9	18.7	18.1	29.8	23.0	25.9

TRIBUTARY BASINS (Primary & Secondary & Snow Courses)	Oregon Number	LOCATION Sec.	Twp.	Range	Elev.	SNOW COVER MEASUREMENTS About April 1, 1940 Date	Avg. Snow Depth (In.)	Avg. Water Depth (In.)	AVERAGE WATER DEPTH (INCHES) One Month ago (3-1-40)	One Year ago (4-1-39)	Two Years ago (4-1-38)	Three Years ago (4-1-37)
UMATILLA RIVER												
Lucky Strike	223	28	3S	32E	5050	3-28	19.4	6.9	8.3	13.9	-	-
Meacham	221	24&25	1S	35E	4300	3-26	3.2	1.3	7.5	10.4	8.2	12.8
Emigrant Springs	222	29	1N	35E	3925	3-26	0.0	0.0	5.8	7.7	3.8	7.9
WILLOW CREEK												
Arbuckle Mountain	241	33	4S	29E	5400	3-29	11.1	4.1	-	11.8	13.0	18.7
JOHN DAY RIVER												
Dixie Springs	244	28	11S	34E	6650	3-30	54.6	18.8	-	24.1	28.0	22.4
Olive Lake	245	14	9S	33½E	6000	3-31	33.3	15.0	12.2	15.6	19.6	17.1
Blue Mountain Spring	133	21	15S	35E	5900	3-30	25.5	8.8	10.3	11.1	23.4	16.1
Arbuckle Mountain	241	33	4S	29E	5400	3-29	11.1	4.1	-	11.8	13.0	18.7
Gold Center	249	21	9S	36E	5340	4-1	18.4	6.8	10.4	9.6	-	-
Izee Summit	964	28	16S	29E	5293	3-30	0.0	0.0	5.2	6.2	8.8	7.5
Starr Ridge	247	20	15S	31E	5156		Discontinued		3.2	1.6	5.0	4.4
Starr Ridge *	247B	20	15S	31E	5150	3-29	0.0	0.0	3.8	-	-	-
Blue Mountain Summit	141	6	12S	36E	5098	3-26	3.0	1.0	5.4	3.0	8.9	6.2
Beech Creek Summit	246A	4	12S	30E	4800	3-24	0.0	0.0	4.5	6.0	7.3	8.4
Schoolmarm	248	28	4S	34E	4775	3-31	0.0	0.0	2.1	4.4	-	-
DESCHUTES RIVER												
New Dutchman	324A	21	18S	9E	6400	4-8	104.0	39.0	-	60.9	60.2	50.0
Charlton Lake	327	23	21S	6E	5750	3-26	35.4	13.9	-	29.6	34.5	30.7
Derr	343	14	13S	23E	5670	4-1	15.9	5.2	-	7.5	13.4	14.7

Note: *Relocation of course No. 247.

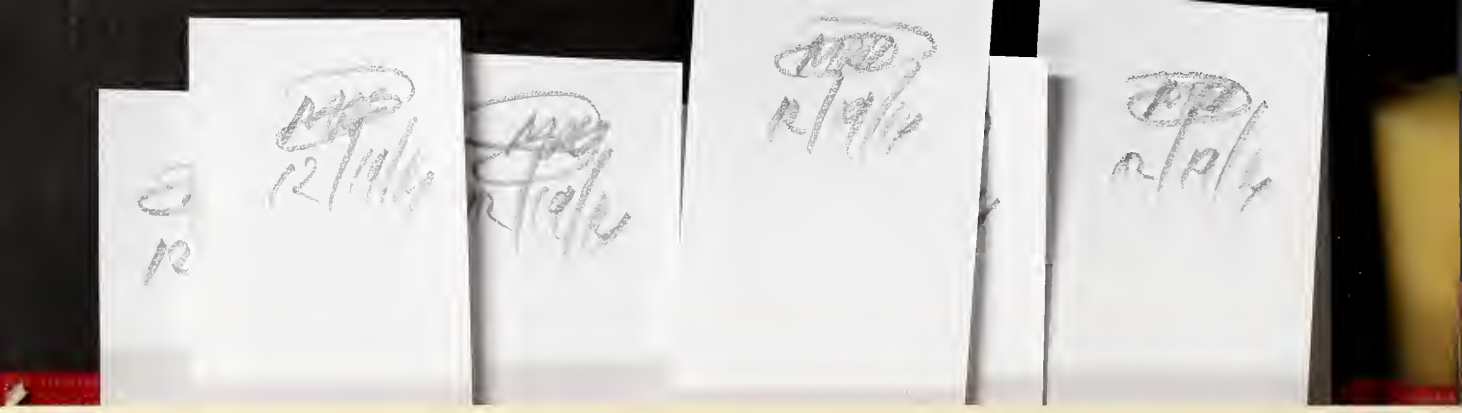


TRIBUTARY BASINS (Primary & Secondary & Snow Courses)	Oregon Number	LOCATION Sec.	Twp.	Range	Elev.	SNOW COVER MEASUREMENTS About April 1, 1940 Date	Avg. Snow Depth (In.)	Avg. Water Depth (In.)	AVERAGE WATER DEPTH (INCHES) One Month ago (3-1-40)	One Year ago (4-1-39)	Two Years ago (4-1-38)	Three Years ago (4-1-37)
Three Creeks Meadows	331	3	17S	9E	5600	3-28	21.1	8.7	-	19.9	24.6	26.1
Ochoco Meadows	341	21	13S	20E	5200	3-29	11.8	3.8	8.0	7.6	14.7	15.0
Cascade Summit	321	7	23S	6½E	4880	3-31	36.6	15.4	-	38.5	31.4	32.4
Tamarack	342	8	15S	25E	4800	3-30	0.0	0.0	-	1.8	8.3	3.9
Crescent Lake	325	11	24S	6E	4760	3-31	0.0	0.0	-	12.9	16.8	9.5
Hogg Pass	351	24	13S	7½E	4755	3-28	47.0	20.4	-	44.4	44.0	-
Marks Creek	344	25	12S	19E	4540	3-28	0.0	0.0	3.1	2.6	6.1	-
Caldwell Ranch	326	30	21S	8E	4400	3-25	1.5	0.8	-	3.8	15.9	13.2
Clear Lake	361	29	4S	9E	3500	3-23	4.6	1.5	-	12.5	16.7	18.3
HOOD RIVER												
Brooks Meadows	431	2	2S	10E	4300	3-25	0.0	0.0	-	9.0	19.0	15.5
SANDY RIVER												
Phlox Point - Mt. Hood	452	6	3S	9E	5600	3-31	81.2	32.4	29.6	65.7	65.7	67.4
Still Creek	451	25	3S	8½E	3700	3-31	1.5	0.7	7.6	25.2	23.2	23.9
Clear Lake	361	29	4S	9E	3500	3-23	4.6	1.5	-	12.5	16.7	18.3
CLACKAMAS RIVER												
Peavine Ridge	591	14&15	6S	7E	3500	4-2	8.1	2.9	7.6	23.3	23.7	25.2
Clackamas Lake	592	35	5S	8½E	3400		N.R.		5.8	14.5	15.7	-
WILLAMETTE RIVER												
Charlton Lake	327	23	21S	6E	5750	3-26	35.4	13.9	-	29.6	34.5	30.7
Waldo Lake	521A	15	21S	6E	5500	3-27	31.9	11.2	-	31.0	33.0	29.0*

Note: *This measurement taken on course No. 521 (relocated).

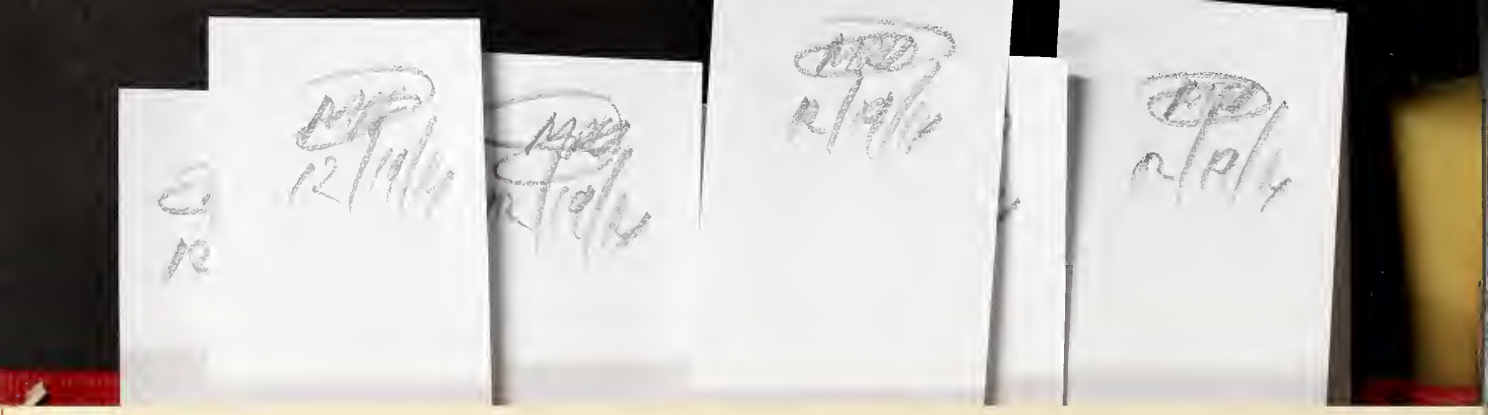
TRIBUTARY BASINS (Primary & Secondary & Snow Courses)	Oregon Number	LOCATION Sec.	Twp.	Range	Elev.	SNOW COVER MEASUREMENTS About April 1, 1940 Date	Avg. Snow Depth (In.)	Avg. Water Depth (In.)	AVERAGE WATER DEPTH (INCHES) One Month ago (3-1-40)	One Year ago (4-1-39)	Two Years ago (4-1-38)	Three Years ago (4-1-37)
Cascade Summit	321	7	23S	6½E	4880	3-31	36.6	15.4	-	38.5	31.4	32.4
McKenzie	531	35	15S	7½E	4800	4-5	40.6	17.2	-	44.8	-	-
Hogg Pass	351	24	13S	7½E	4755	3-28	47.0	20.4	-	44.4	44.0	-
Champion	522	12	23S	1E	4500	4-1	5.0	1.9	9.6	44.4	-	-
Mary's Peak	541	21	12S	7W	3620	4-1	0.0	0.0	-	14.8	-	-
INTERIOR DRAINAGE												
SILVER LAKE												
Silver Creek	942	25&26	29S	13E	4900	4-1	0.0	0.0	1.4	N.R.	-	-
CHEWAUCAN RIVER												
Mill Creek	922	1	34S	17E	6200	3-31	18.2	3.5	6.0	2.2	-	-
HARNEY BASIN												
Fish Creek	952	4	33S	33E	7900	3-27	67.1	22.7	-	22.2	-	-
Silvies	951	35	32S	33E	6900	3-28	21.4	8.4	-	12.1	16.6	6.0*
Deer Creek	973	17	36S	26E	6670	4-1	14.7	4.2	6.1	-	-	-
Hart Mountain	971	1	36S	25E	6350	4-1	4.7	0.6	2.8	0.0	-	-
Izee Summit	964	28	16S	29E	5293	3-30	0.0	0.0	5.2	6.2	8.8	7.5
Idylwild	961A	33	20S	31E	5200	4-1	0.0	0.0	4.3	1.0	7.7	5.8
Starr Ridge	247	20	15S	31E	5156		Discontinued		3.2	1.6	5.0	4.4
Starr Ridge **	247B	20	15S	31E	5150	3-29	0.0	0.0	3.8			
Rock Spring	134	23	18S	32E	5100	4-1	0.0	0.0	5.4	0.9	8.8	3.9

Note: *May 7, 1937. **Relocation of course No. 247.



TRIBUTARY BASINS (Primary & Secondary & Snow Courses)	Oregon Number	LOCATION Sec.	Twp.	Range	Elev.	SNOW COVER MEASUREMENTS About April 1, 1940 Date	Avg. Snow Depth (In.)	Avg. Water Depth (In.)	AVERAGE WATER DEPTH (INCHES) One Month ago (3-1-40)	One Year ago (4-1-39)	Two Years ago (4-1-38)	Three Years ago (4-1-37)
GUANO LAKE												
Bald Mountain	Nev.	17	45N	21E	6720	3-27	3.8	1.1	2.9	-	-	-
Guano Creek	972	13	36S	25E	6480	4-1	9.4	2.4	5.6	-	-	-
WARNER LAKE												
Camas Creek	911A	5	39S	21E	5720	3-29	10.6	3.4	-	6.7	-	13.2*
WEST COAST DRAINAGE												
UMPQUA RIVER												
Diamond Lake	743	29	27S	6E	5315	3-30	28.6	9.8	9.6	19.7	33.1	23.2
Whaleback	7217	3	31S	2E	5140	3-30	49.5	19.5	-	38.4	45.4	42.0
Champion	522	12	23S	1E	4500	4-1	5.0	1.9	9.6	44.4	-	-
No.Umpqua nr. Lake Creek	742	19	26S	6E	4215	4-1	0.0	0.0	-	15.9	19.7	14.1
Trap Creek	741	1	27S	4E	3800	4-1	0.0	0.0	-	18.1	23.3	16.6
Goolaway Mountain	7215	30	32S	3W	3730	3-29	0.0	0.0	2.1	4.1	24.0	14.3
Goolway Gap	726	32	32S	3W	3000	3-29	0.0	0.0	0.6	0.1	10.0	6.3
ROGUE RIVER												
Seven Lakes No. 1	7211	3	34S	5E	6800	4-3	99.8	40.4	-	57.5	72.0	61.1
Wagner Butte	7213	1	40S	1W	6900	3-26	35.2	13.2	14.3	15.8	21.6	21.3
Big Red Mountain	729	33	40S	1W	6500	3-27	69.6	27.9	-	21.5	44.6	34.1
Little Red Mountain	7210	25	40S	2W	6500	3-28	50.8	20.5	-	17.4	37.4	27.1
Seven Lakes No. 2	7212	26	33S	5E	6200	4-2	77.6	31.7	-	43.3	49.3	49.9

Note: *Course No. 911.



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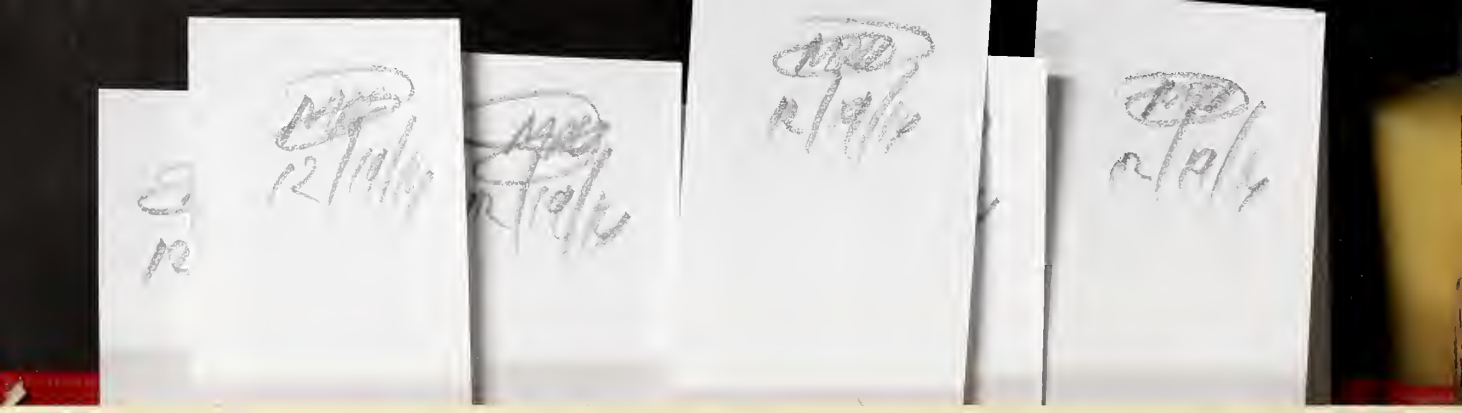
Annie Spring	831	19	31S	6E	6018	4-1	104.4	44.1	38.0	37.4	61.9	43.5
Billie Creek Divide	722	17	36S	5E	6000	3-29	19.4	9.4	10.8	33.1	26.4	26.6
Grayback Peak	727	9	40S	5W	6000	3-31	35.8	15.0	-	29.4	52.7	34.2
Whaleback	7217	3	31S	2E	5140	3-30	49.5	19.5	-	38.4	45.4	42.0
Hyatt Prairie Reservoir	723	15	39S	3E	4900	3-30	3.1	1.5	4.5	12.2	17.1	13.8
Fish Lake	725	3	37S	4E	4865	3-29	0.0	0.0	2.7	19.2	19.0	16.1
Siskiyou Summit	728	17	40S	2E	4630	3-31	0.0	0.0	3.0	1.0	15.5	11.5
Althouse	7216	17	41S	7W	4400	3-30	0.0	0.0	2.9	6.7	27.6	21.8
Goolaway Mountain	7215	30	32S	3W	3730	3-29	0.0	0.0	2.1	4.1	24.0	14.3
Silver Burn	7219	30	30S	4E	3720	3-31	0.0	0.0	2.5	12.7	23.3	15.2
South Fork Canal	7218	12	33S	3E	3500	3-31	0.0	0.0	0.0	0.0	7.4	0.0
Goolaway Gap	726	32	32S	3W	3000	3-29	0.0	0.0	0.6	0.1	10.0	6.3
KLAMATH LAKE BASIN												
Summer Rim	841	15	33S	16E	7200	3-29	43.8	13.5	12.6	N.R.	20.6	14.4
Seven Lakes No. 1	7211	3	34S	5E	6800	4-3	99.8	40.4	-	57.5	72.0	61.1
Seven Lakes No. 2	7212	26	33S	5E	6200	4-2	77.6	31.7	-	43.3	49.3	49.9
Annie Spring	831	19	31S	6E	6018	4-1	104.4	44.1	38.0	37.4	61.9	43.5
Billie Creek Divide	722	17	36S	5E	6000	3-29	19.4	9.4	10.8	33.1	26.4	26.6
Strawberry	837	4	40S	16E	5600	3-28	0.0	0.0	5.0	4.0	-	-
Quartz Mountain 2/		33	37S	16E	5504	3-31	0.0	0.0	3.8	0.0	13.6	9.0
Sun Mountain	836	22	32S	7½E	5350	3-29	53.9	21.7	21.0	23.5	39.7	26.2
Quartz Mountain	811	2	38S	16E	5320	4-1	0.0	0.0	3.1	0.0	15.7	9.4
Crowder Flat (California)		30	47N	11E	5200	4-1	0.0	0.0	Trace	0.0	-	-
Taylor Butte	842	16	33S	11E	5100	3-29	0.0	0.0	-	0.0	11.3	4.8
Lake of the Woods No. 1	835	11	37S	5E	4960	3-31	2.0	0.8	2.8	10.3	18.6	12.8
Hyatt Prairie Reservoir	723	15	39S	3E	4900	3-30	3.1	1.5	4.5	12.2	17.1	13.8



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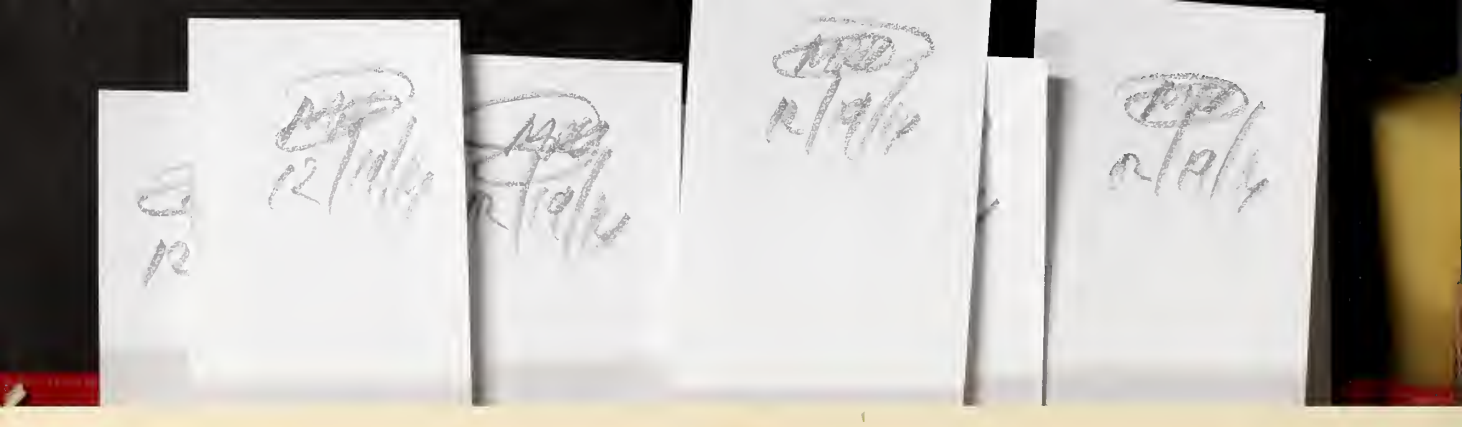
Richardson Ranch 2/		22	35S	14E	4800	3-31	0.0	0.0	0.0	0.0	0.8	0.0
Chemult No. 1	834	21	27S	8E	4760	3-27	5.4	2.0	8.0	5.2	18.7	8.0
Yamsey 2/		19	30S	11E	4600	3-31	0.0	0.0	0.0	0.0	2.2	5.5
Kirk 2/		1	33S	7E	4533	3-31	1.0	0.2	0.0	0.0	7.5	4.5
Beatty 2/		22	36S	12E	4300	3-31	0.0	0.0	0.0	0.0	0.0	0.0
Crystal 2/		26	34S	6E	4200	3-31	0.0	0.0	5.2	4.5	8.5	10.1
Pelican 2/		10	36S	6E	4200	3-31	0.0	0.0	0.0	2.0	5.5	1.5
Chiloquin 2/		34	34S	7E	4187	3-31	0.0	0.0	0.0	0.0	1.5	0.0
Rocky Point 2/		26	35S	6E	4150	3-31	0.0	0.0	0.0	0.0	3.6	2.6
Fort Klamath 2/		22	33S	7½E	4150	3-31	0.0	0.0	0.0	0.0	6.5	4.0
GOOSE LAKE BASIN												
Camas Creek	911A	5	39S	21E	5720	3-29	10.6	3.4	-	6.7	-	13.2*
Strawberry	837	4	40S	16E	5600	3-28	0.0	0.0	5.0	4.0	-	-
Quartz Mountain 2/		33	37S	16E	5504	3-31	0.0	0.0	3.8	0.0	13.6	9.0
Quartz Mountain	811	2	38S	16E	5320	4-1	0.0	0.0	3.1	0.0	15.7	9.4

Note: *Course No. 911.



IRRIGATION WATER SUPPLY FORECASTS

SEASON OF 1940

- Foreword -

During the period from March 23 to April 8, measurements of snow depth and water content were secured on all snow courses in Oregon.

For the reason that a great many of the Oregon courses are but newly established, and in view of the further fact that on very few of the courses do the records extend back for more than a few years, it has been difficult to arrive at definite correlations between water on the ground as snow and subsequent stream flow. In the case of certain stream basins, however, correlations have been made. Full use has been made of correlations developed by engineers of cooperating agencies.

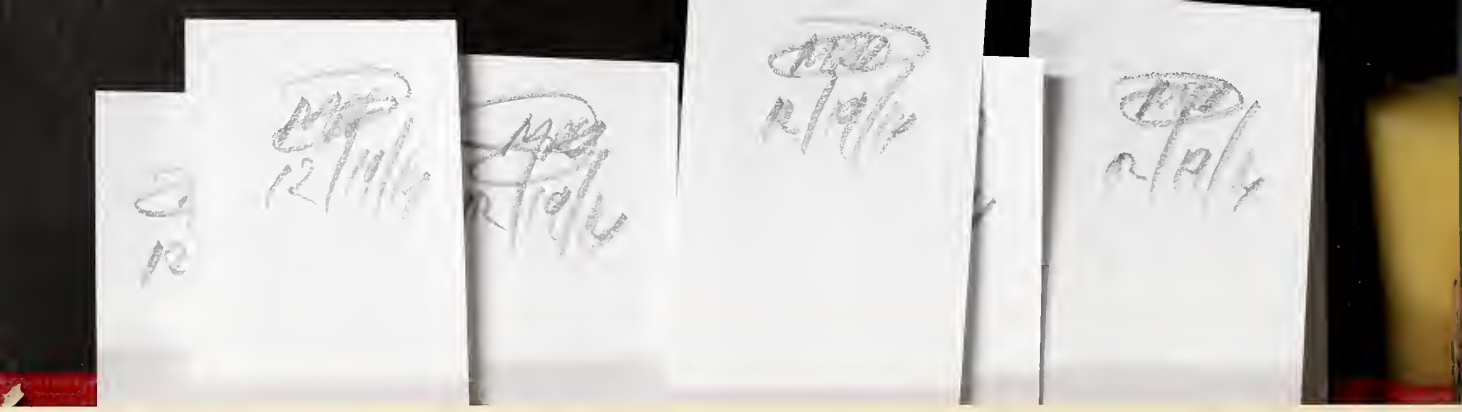
Lacking the extended records on which accurate forecasts must be based, but believing that information accumulated to date is of value in forming general estimates of prospective water supplies for Oregon in 1940, a series of water forecast committee meetings were held in important irrigated regions of Oregon for the fifth consecutive year during the period April 5 to 12 as follow: Grants Pass for Southern Oregon; Redmond for Central Oregon; Lakeview for Southeastern Oregon; Ontario for Eastern and Northeastern Oregon; Pendleton for the Umatilla-Walla Walla River Basin; and Portland for the Columbia River Basin, embracing drainages in seven states and British Columbia. Most of the cooperating agencies were represented at those round table discussions.

An informal report was prepared of the results of each meeting, outlining the irrigation water supply prospects as of April 1 for various Oregon stream basins. The gist of these reports is reproduced herewith. It is understood, of course, that later modifications of the forecasts may be required in accordance with unforeseen deviations of precipitation and temperature from normal during the run-off season.

Forecasts

Southern Oregon

The past winter has been unlike any previous winter for which snow and stream flow figures are available. Mean temperatures have been so much above normal that precipitation in the higher elevations has come this year mostly as rain rather than snow. Some of this precipitation has gone toward replenishing ground storage, but flashy stream run-off has also passed much of the precipitation into reservoirs or the run-off has gone to waste. Consequently, on April 1 snow water content on nearly all snow courses, regardless of elevation, was below normal and with a few exceptions was materially less than last year. Snow water content on



some watersheds is the lowest ever measured since snow measurements began in 1928 and 1929. However, expected stream flow may not be decreased to as extreme a low as the deficient snow supply might indicate, because watershed soils appear well primed. So far as the Southern Oregon Committee could determine, the favorable soil moisture in watersheds should partly compensate at least for the striking snow deficiency, especially in the Cascade Mountains.

Total flow of Rogue River at Ray Gold for the stream flow year should be about 103% normal. For the May-September inclusive period, low flow is expected to be about the same as last year and 80% of normal. Low mean flow for the month of July 1940 is estimated at 1,175 cubic feet per second, for August 920 cubic feet per second and for September 860 cubic feet per second. Mean low flow for September 1939 was 1,002 cubic feet per second. This is expected to result in late season canal rotation by the Grants Pass Irrigation District. However, for some time yet to come water supplies of the Grants Pass District will be ample and it does not appear advisable for farmers there to plan early irrigation.

The Applegate River, a stream lacking storage facilities, is expected to reach a deficient flow stage about a month earlier than last year. Up to July 1 the stream flow should be 70% of last year's, but during August and September will probably not exceed 50 to 60% of the 1939 flow for those two months. A very serious water shortage is expected on this stream and farmers are urged to take every advantage of spring run-off, beginning their irrigation in the near future with the object of holding crop land soil moisture at favorable stages for as long as possible. The planting of late maturing crops on lands served by this river, with the exception of those lands served by the oldest and most secure water rights, is not believed advisable.

Flow of the Little Applegate River is expected to be nearly as good as last year, providing usual summer weather conditions prevail. The break to low flow will probably come about the same time as on the main Applegate, but the reduction from spring flow to late summer flow should not be as great as on the main Applegate.

Other tributaries to the Lower Rogue, such as Evans Creek, Graves Creek and the Illinois River, are expected to have a low flow only one-half that of last year and farmers on these streams, remembering their particular water supplies of last year, might well plan their crop plantings accordingly.

On the main Umpqua River flow for the twelve months stream year is expected to be less than last year and about 75% normal. However, for the important tributaries, principally depended upon for irrigation supplies, such as Cow Creek, low flow is expected to be not over 50% of that in 1939 and will probably not exceed that of 1934.

Farm soils in the Rogue River valley appear to be very well wetted. Valley land soil moisture storage as of April 3 is considered about 15%

above an average of the past five seasons and about 30% better than at the same time last year.

Water stored in reservoirs of the Talent, Medford and Rogue River Irrigation Districts probably will be sufficient if normal summer weather prevails, but economy measures which will reduce irrigation waste to a minimum are recommended. Emigrant Gap reservoir is now full to capacity. Hyatt Prairie reservoir is expected to peak in capacity at 8,500 A.F., a little better than 50% full. Fish Lake reservoir is expected to peak at 5,500 A.F., or 71% capacity. Four Mile Lake reservoir is expected to peak in storage at 11,000 A.F., or 78% of capacity. Total storage in these four reservoirs is expected to equal 70% of the total maximum storage obtained last year. The T.I.D. canal through Wagner Gap may cease delivery of water a week earlier than in 1939, when that ditch ceased delivery on July 3. Farmers and fruit growers in these Districts are being advised to:

1. Make as full use as possible of flood water as long as it is available.
2. Practice farming methods that will conserve moisture.
3. Avoid the planting of crops which demand excessive water or which will mature late in the season.

Although the storage supply should be sufficient and no crop losses are anticipated if care is taken, there is some doubt as to any appreciable supply being held over in these various reservoirs by the end of the 1940 irrigation season.

The growing season in Jackson County is somewhat advanced beyond normal and slightly advanced over last year. Ordinarily, this would be favorable to best use of the limited irrigation supply as crops would mature earlier. However, the wet spring has delayed many crop plantings so final crop maturity may not differ much from normal. In Josephine County, the season now appears to be about a week ahead of normal.

The net inflow to Upper Klamath Lake for the stream flow year, October 1, 1939 to September 30, 1940, is set at a minimum of 1,040,000 acre feet, with a possibility of securing 1,100,000 A.F. The first figure represents a net inflow of 83½% normal. The inflow last year was 69.9% normal. Farm lands in the Klamath Basin are very well wetted and with drying weather, soil moisture conditions there should be very favorable. There will be ample irrigation water supplies for this area during the coming season as usual.

Inflow to Gerber reservoir for the stream flow year ending September 30, 1940 is estimated at 75,000 A.F., or about 54% above average. On April 1 the available storage was 80,120 A.F., as compared to 54,390 A.F. on the same date last year. This reservoir is operated as a flood control works and storage will be drawn down to about 75,000 A.F. as soon as flood conditions along Lost River will permit. This storage provides greater than a two-year irrigation supply for the lands served from this source.

Available storage in Clear Lake reservoir on April 1, 1940 was 277,920 A.F. as compared with 249,600 A.F. on the same date last year. Total inflow for the stream year ending September 30, 1940 will approximate 170,000 A.F., or about 70% greater than average. Storage plus anticipated inflow assures an available irrigation water supply for over two years.

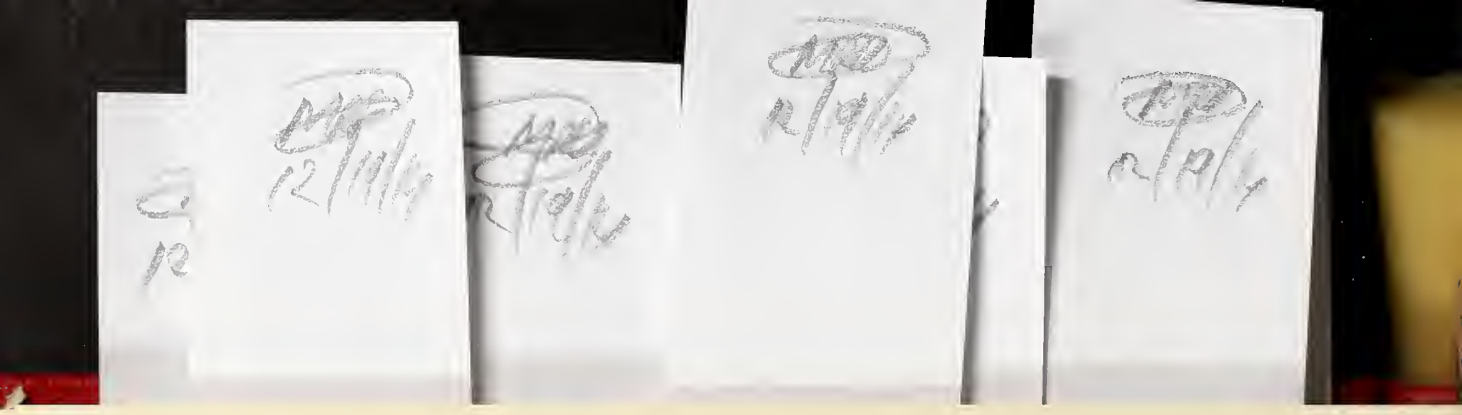
Spring range conditions in the Siskiyou Forest are expected to be about normal. Earlier spring range than usual will be available in the Rogue River Forest and very good spring range conditions prevail in the Klamath Basin and on lands of the Klamath Indian Reservation.

Central Oregon

The outlook for late and mid-summer water supply to lands served by the Ochoco reservoir has greatly improved during the closing days of March and an adequate supply is in sight. Last year Ochoco reservoir storage peaked at about 33,500 acre feet. Most of that water was used during the irrigation season, as holdover amounted only to approximately 3,000 acre feet. However, storage water withdrawal will not begin this year at as early a date, and even though the reservoir is not expected to peak in storage at more than 25,000 acre feet, that supply actually should prove better than the approximate 30,000 acre feet withdrawn from storage last year. This is because of the excellent crop land and soil moisture conditions now found. The improved crop land soil moisture as contrasted with last year is estimated equal to one acre foot per acre at this time. For the district this would equal an additional reservoir storage of 8500 acre feet. Very little draft on storage is anticipated before May 10, as contrasted with opening date of April 15, in 1939.

Snow depth and water content for the contributing drainage area to Ochoco reservoir is less than in any one of the past three years, but ground water supplies appear to be so well restored that the snow shortage will not reduce inflow proportionately. The watershed soil is altogether unfrozen and ground storage conditions seem more favorable than for several years. Absence of drying winds plus some effective precipitation during the late spring months would favor even sufficient holdover to permit "irrigating up" late summer seeded clover.

Snow depth and water content at Three Creeks meadows near Squaw Creek headwaters equal only 45 percent of last year and are far below either of the two previous years, and only very slightly greater than 1931. Ground storage is not so effective on this watershed in augmenting deficient snow supplies; therefore a definite water shortage is foreseen for farm lands around Cloverdale under the Squaw Creek canal, beginning about July 1. The flow is expected to drop to approximately 60 c.f.s. maximum flow in July and to 35 to 40 c.f.s. maximum flow during August and September. 128 c.f.s. is considered a full supply for old water rights.



The Plainview and McAllister ditches are expected to be shut off much earlier than usual and are not likely to receive water after about June 15. Accordingly, these ditches may receive water four to five weeks, depending on the beginning date of material snow melt in the mountains. Crops in the Deschutes Basin appear to be in about normal stage of growth; therefore, the water shortage foreseen here is not likely to be lessened by advanced crop maturity.

Tumalo Project lands may expect a shorter water supply than last year and the supply may be definitely short after September 1. Reservoired storage is expected to last through July and August. Tumalo Creek flow during July and August will be very much less than in the corresponding months in 1939.

Crescent Lake is expected to peak in storage at 43,000 acre feet, materially under last year's maximum. Crane Prairie reservoir now has in storage 36,000 acre feet and will fill to the capacity limited by agreement.

Even though ground water storage appears very good on watersheds contributing to the main Deschutes River, the snow deficiency there is so great that it seems doubtful if low flow of the main Deschutes will more than equal 80 percent of last year for the same period. The beginning of low flow probably will occur a month earlier this year. Because very favorable crop land soil moisture conditions now will tend to delay storage withdrawal, the lands under the C.O.I. can expect practically normal irrigation supply with perhaps a mild shortage late in the season beginning about August 15.

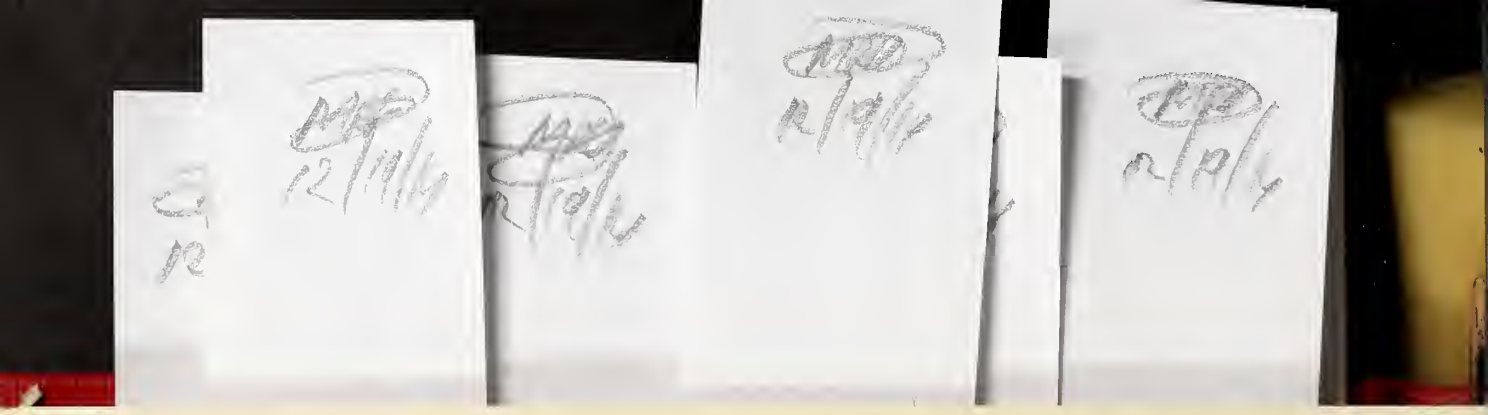
Moisture penetration in farm lands near Madras is reported at about 48 inches, which is deeper than in either 1939 or 1938, but not quite as deep as in 1937.

Early range will be excellent in the Ochoco Forest this year and prospects for late range have improved considerably in the last three weeks, but because of early recession of snow cover to higher levels, late range will be largely determined by future precipitation.

Southeastern Oregon

Above normal precipitation in the form of rain, together with higher temperatures than usual, has resulted in flashy run-off of streams. Irrigation and stock water reservoirs are well filled. Snow remaining in the mountains April 1 is considerably less than on April 1 last year and in some cases is the lowest since measurements have been taken. The ground is well primed to hardpan, however, and the low water flow during the summer months is not expected to be any less than in 1939.

Thompson valley reservoir, which has a total capacity of 19,000 acre feet, had 10,700 acre feet in storage on April 1. It is expected to



peak at about 12,000 acre feet, more than enough for this season's needs.

Cottonwood reservoir, which holds about 4,160 acre feet, is not yet full but will fill before irrigation starts to capacity limited by agreement. Drews reservoir, which has a capacity of 62,500 acre feet, is now filled and spilling over.

The total flow of Chewaucan River will probably exceed that of last year for the stream flow year, but the low flow may not exceed last year for the three months of July, August and September. The total flow through the months of March, April and May is expected to be about equal to that of 1939. Irrigated lands in the Chewaucan valley are now well saturated and irrigation water requirements should not be as great as in 1939. The low water flow in the Chewaucan is expected to come at least a month earlier than in 1939.

Conditions in Warner valley compare to those of the Chewaucan. Due to the early run-off from Twenty Mile and Deep Creek it is expected that more land will be covered than was irrigated last year. Hart Lake is expected to very nearly fill, but is not likely to overflow. Low water flow into Warner valley will be less than in 1939 because of early run-off and the small amount of snow remaining at higher elevations.

The smaller streams tributary to Goose Lake Valley had a heavy run-off in March and low water flow will come much earlier than normal, being probably a month earlier than in 1939. To offset these unfavorable conditions, it is found that the soil in the valley floor is well wetted. The mild winter has not retarded growth of plant life and the growing season now is some two or three weeks ahead of last year. A considerable acreage is being seeded to grain this year, and this crop will require less water than wild grasses and hay.

Forage conditions in the Fremont Forest are generally very favorable and prospects are very good for early range. The condition of late pasture will depend largely on rains in May and June.

Hart Mountain Antelope Refuge and the Guano Lake drainage has had heavy precipitation all winter and spring, and range conditions there now appear very good.

Eastern Oregon

On the Owyhee River drainage, precipitation in the form of rain apparently may influence later run-off as much as precipitation stored as snow on April 1. While snow supplies on this watershed in Oregon, Idaho and Nevada are generally deficient especially in the lower levels, the total precipitation is much above normal. This undoubtedly will result in restoration of ground water supplies which in turn are expected to bolster the low flow from what might otherwise be expected. Run-off for the season which will end September 30, 1940 is estimated at 575,000 acre feet or 70% of normal, with 270,000 acre feet so far obtained. The

run-off for the six months, April to September inclusive, is estimated at 295,000 acre feet or 132% of that in the same period last year. Owyhee Reservoir will fill, possibly by April 24, thus putting a two year supply in sight for lands served by this reservoir. Additional snow measurements to those listed in the first part of this report were made this year for the first time at higher elevations on South Mountain. Due consideration is given to results of these measurements which show the presence of considerable snow at high elevations. The flow of upper tributaries to the Owyhee originating in Idaho during the low flow period may accordingly exceed that of any year since 1935.

Antelope reservoir is expected to fill to capacity within about two weeks. Soil moisture conditions in Jordan Valley crop lands are more favorable by far than last year and in fact farming operations are being delayed because of wet soil. Consequently, storage withdrawal will be delayed from that of last year by approximately one month. A small hold-over at the end of this irrigation season seems possible. The use of irrigation water on Owyhee lands began in 1939 soon after April 8. Irrigation is not expected to begin this year until April 22. Because of superior soil moisture conditions prevailing in farm lands around Vale and Ontario, one watering this year may mature the first alfalfa cutting as against two waterings customarily required. Here too, as in Jordan Valley, farm work is about two weeks delayed by wet soil. Grain crops will not require the usual amount of water this season and all in all the Owyhee reservoir hold-over will be greater than usual.

Warmsprings reservoir now holds 184,000 acre feet and is expected to peak in storage at full capacity of 190,000 acre feet by April 20.

Agency Valley reservoir is full and spilling.

The total flow of the Malheur River Middle Fork for the stream flow year which will end September 30, 1940 is set at 160% normal and the North Fork run-off for the stream year is set at approximately 180% normal. For the stream flow year, total run-off of these two forks of the Malheur is expected to be about 256,000 acre feet.

After June 1 natural flow of the Malheur River, even with deficient snow supplies now existing, should be about the same as last year. Because of high crop land soil moistures and better than normal natural stream flow, a total hold-over at the end of the 1940 irrigation season of 150,000 acre feet is anticipated in Warmsprings and Agency Valley reservoirs combined. Therefore, a good two year supply for lands served by these reservoirs is definitely in sight at this time.

Willow Creek reservoir has in storage now 8,000 acre feet and with favorable run-off conditions may peak in storage at 9,000 acre feet this year. Hold-over of 4,000 acre feet at the close of the irrigation season is possible.

Precipitation in the John Day valley and on the watershed feeding the John Day River and its tributaries appears the greatest since 1912.

While the mountain snow deficiency below 5,000 feet is striking, the deficiency decreases with increasing elevation and above 6,000 feet is not great. The soil is so saturated that remaining snow will yield more water than would otherwise be expected. The John Day and its tributaries will probably show above normal low flow and a better flow than last year when these streams held up somewhat better than expected. The lower tributaries of the John Day are expected to provide an insufficient low water flow and the low water flow may not materially exceed that of last year. Soil moisture conditions in John Day valley farm lands are very much better than last year and the best for many years. Likewise, prospects for spring range are now better than for a good many years.

In the Harney Basin valley precipitation since October 1, 1939 totals 9.97 inches, more than in the same period of any of the past twenty-six years. For the first time in the twenty-six years that records have been kept at the Harney Branch Experiment Station the moisture in the surface soil has connected with the ground water-table at an approximate seven foot depth. Peak flow of streams entering the Harney valley from the north appears to have been reached and these tributaries are expected to decrease in flow from now on.

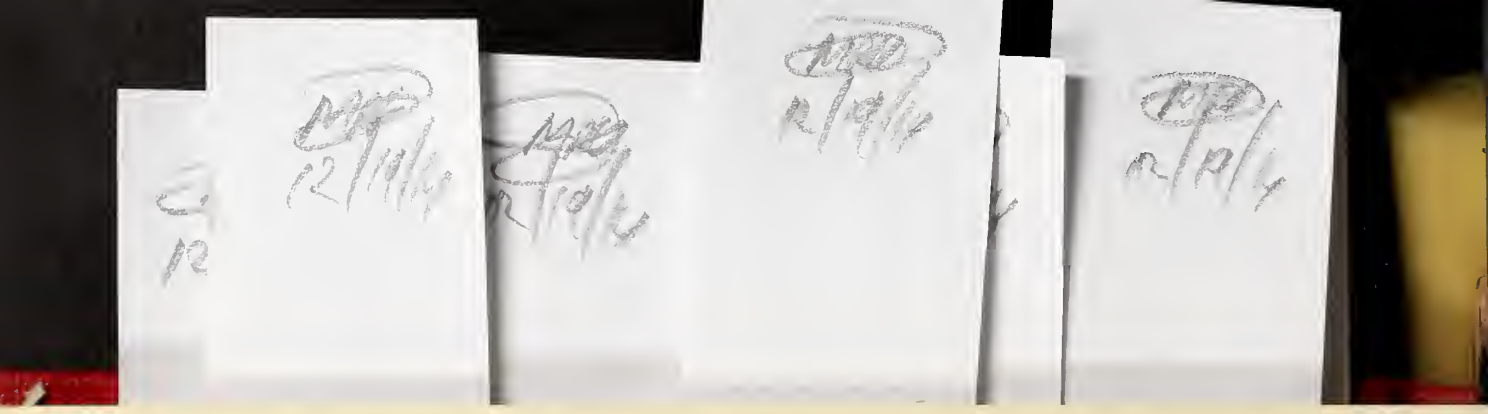
Silvies River is expected to have a low water flow, at least twice as good as last year, and low flow of Silver Creek should be one-fourth to one-third better than in 1939. Approximately 15% more hay land has so far been covered by flood water from these streams than by this time last year.

The streams running from the west into Catlow valley have shown a strong flow this year. Rock Creek, for instance, has had a peak flow of 65 second feet, but is rapidly receding now. The low water flow will be short. Those streams coming west from the Steens Mountain should hold up about the same as last year when the supply was 38% less than in 1938. The Blitzen River should deliver 65,000 acre feet this year. The peak flow of Blitzen River is expected yet to come and better coverage than usual is expected because of high soil moisture in the valley lands below. Prospects for early range are generally better than for several years.

Northeastern Oregon

Snow supplies remaining on Burnt River watersheds are greatly reduced from those measured last month and average somewhat less than last year and very much less than in 1938. The peak flow for Burnt River appears to be over for this spring and flow is expected to decrease steadily from now on, but extreme low flow should be slightly greater than last year. Unity reservoir is full and spilling water and during the next fifteen days, run-off for spreading on wild hay lands is estimated at 7,500 acre feet.

Snow surveys on the main Powder River do not differ greatly from those of last year, but ground water storage has been somewhat refreshed by above normal precipitation. Consequently, both total flow and late summer flow are expected to be from 15% to 20% greater than total flow and low flow last year.



Soils in the Baker valley are quite wet and farming operations have been so delayed that maturity of some crops may come two weeks behind last year.

Thief Valley reservoir is full and overflowing.

Low flow of the North Powder is not expected to be as good as last year and probably will not exceed eighty percent of last year's low flow. The North Powder is now running low and clear and snow has receded to higher levels without appreciable surface run-off. Water stored in snow at the highest levels is less than last year.

On the main Grande Ronde River the snow situation is quite similar to that on the North Powder and low flow of the Grande Ronde is not expected to exceed 80% of that last year. However, on Catherine Creek snow water supplies are only slightly less than those of last year and ground storage conditions are more favorable; therefore, both total flow and low flow of Catherine Creek should be at least as good as last year.

Over in the Wallowa Mountains snow water content is very slightly better than last year but ground water conditions appear somewhat better. Wallowa Lake only holds about 15,000 acre feet at present compared to 38,000 acre feet a year ago. It is not likely that Wallowa Lake will spill water this year as it did last year and the year before, but favorable to conserving lessened supplies is the fact that the irrigation season is about two weeks delayed from last year and crop land soil moisture is estimated better than last year by an amount equal to eight-tenths of an acre foot per acre of stored irrigation water.

Water supplies in the Lostine River and Hurricane and Bear Creek districts will be somewhat short this fall. Prospects for spring range in the Wallowa Forest are about average.

Umatilla-Walla Walla Basin

Adequate reservoir storage and especially good soil moisture will largely compensate for unusually meager snow supplies in the watershed supplying irrigated lands in Umatilla and Morrow Counties. A probable shortage of water available to later rights on the Walla Walla River is foreseen beginning around August 1. Forecasted flow for the six months period ending September 30, 1940 will be less than last year on the Umatilla and Walla Walla Rivers and McKay and Butter Creeks. On each of these streams the total flow for the stream flow year will be less than for the stream year 1938-39.

Tabulated stream flow forecasts follow:

Stream	Run-off Obtained in Acre Feet		Forecasted Run-off in Acre Feet	
	Stream Year 1938-39	Six Months Apr.1-Sept.30	Stream Year 1939-40	Six Months Apr.1-Sept.30
So.Walla Walla River	112,680	61,150	102,000	40,000
Umatilla R. at Gibbon	149,070	65,720	118,735	35,000
Umatilla R. " Pendleton	321,720	122,140	266,000	70,000
McKay Creek	58,977	13,410	52,000	12,000
Butter Creek	8,793	2,872	7,600	2,300

Cold Springs reservoir will fill. McKay reservoir supplying the Stanfield Project has approximately 63,000 acre feet now in storage and with considerable flow still to come from McKay Creek, while not expected to fill this year, may peak in storage at 66,000 acre feet compared with 72,000 last year. This will be 88% of capacity. Storage hold-over at the close of this season could equal a total of 10,000 acre feet.

Favorable crop land soil moisture conditions will delay storage withdrawal from McKay Creek to a later date than last year. Soil moisture conditions in Columbia Basin wheat lands are better than last year and comparable to 1938. At the Hermiston Experiment Station near Hermiston, water held in the upper four feet of irrigated alfalfa land compares for the last three years as follows:

4-1-40	4-1-39	4-1-38	4-1-37
8.27"	7.08"	8.34"	4.50"

Present soil moisture conditions thus compare in this area with those in 1938. The same comparison holds also for moisture penetration into unirrigated lands near Hermiston. Penetration of winter rain near Heppner appears better than average. Penetration in wheat lands near Athena is very much better than last year. In all wheat lands near Pendleton, soil moisture has penetrated about one-quarter deeper than last year.

Prospects for Umatilla Forest range are very good, so far as soil moisture is concerned.

Flow of Willow Creek is not expected to hold up beyond another two or three weeks because of short snow supplies in the Arbuckle Mountain area.

Ditch Creek heading in the John Day watershed is now at about its peak.

Summer stream flow in western Wasco County and the East Fork of Hood River will doubtless be even lower than last year, judging from extremely deficient snow supplies.

* * * * *